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ABSTRACT

Professors Ernest Sternglass (University of Pittsburgh) and Steven Bell (Berry College) have assembled cogent, conclusive evidence indicating that nuclear radiation is associated with impaired cognition. They suggest that Scholastic Aptitude Scores (SATs), which have declined steadily for 19 years, will begin to rise. Their prediction is based on the presumption that radioactive fallout from an extremely large number of nuclear bomb tests of the 1950s/1960s was deeply involved in the dramatic decline of SAT scores during the 1970s. Additional facts supporting the Sternglass/Bell hypothesis include: (1) the steady decline in SAT scores beginning 18 years after 1945, the year in which the first series of atomic bombs were detonated; (2) beginning with 1977/78, a corresponding abrupt slowing in the decline of SAT scores; (3) strong parallel of SAT scores and nuclear tests evident in SAT verbal score averages; (4) sharpest decline in SAT scores documented for youths born in precise years when annual kilotons detonated in Nevada was greatest; and (5) geographic differences. This and other information strongly support the conclusion that fallout from nuclear weapons was a significant and previously neglected factor in the recent decline of cognitive ability among young Americans. (JN)

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NUCLEAR RADIATION DAMAGES MINDS!

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Nuclear Radiation Damages Minds!

Overview

Nuclear radiation is associated with early age cognitive damage. Sobering facts substantiate and support this frightening claim. Every concerned, responsible individual in the nation should know these facts.

Professor Ernest Sternglass, Univeristy of Pittsburgh, and professor Steven Bell of Berry College, have assembled cogent, conclusive evidence indicating that nuclear radiation is associated with impaired cognition. For example - they predicted, in a 1979 paper presented at the annual meeting of the American Psychological Association, that Scholastic Aptitude Test scores, (the SATs), which had declined steadily for 19 years, would begin to rise. Their prediction was based on the presumption that in the dramatic decline of SAT scores during the 1970s, radioactive fallout from an extremely large number of nuclear bomb tests of the 1950s and early 1960s was deeply involved

Consider the following facts - very carefully:

> "When men split the nucleaus of the atom, they unleashed into terrestrial nature a basic energy of the cosmos - the energy latent in mass - which had never before(underlining supplied) been active in any major way on earth." (Schell,p.9)

Among its other ghastly consequences:

> "neutron bombs and nuclear devices which have been officially labeled 'enhanced radiation weapons' derive their names from the fact that they emit a tremendous yield of lethal neutron activity. When exploded, the neutron bomb effectively kills people. .... Any person within a half-mile radius (of the explosion) would receive an 8,000-rad dose of radiation (a chest X-ray involves less than one rad), and would die instantly. People within a mile radium of the detonation would die of radiation sickness from a day to a month later." (Fadness: p.548)

> "nuclear weapons produce many destructive effects. At the moment of explosion, when the temperature of the weapon material, instantly gasified, is at the superstellar level, the pressure is millions of times the normal atmospheric pressure. Immediately, radiation, consisting mainly of gamma rays, which are a very high form of electromagnetic radiation, begins to stream outward into the environment. This is called the 'initial nuclear radiation', and is the first of the destructive effects of a nuclear explosion. In an air-burst of a one mega-ton bomb - a bomb with the explosive yield of a million tons of TNT, which is a medium-sized weapon in present-day nuclear arsenals - the nuclear radiation can kill human beings in an

area of some six square miles." (Schell: p.17)

In addition:

"When the fusion and fission reactions (of the nuclear weapon) have blown themselves out, a fireball takes shape. ....As the fireball burns, it rises, condensing water from the surrounding atmosphere to form the characteristic mushroom cloud. If the bomb has been set off on the ground or close enough to it so that the fireball touches the surface, in a so-called ground burst, a crater will be formed, and tons of dust and debris will be fused with the intensely radioactive fusion products and sucked up into the mushroom cloud. ....Air burst may also produce local fallout.... exposing human beings to radiation disease, an illness that is fatal when exposure is intense."
(Schell: pp. 15,19)

"The danger from radiation cannot be stressed too much. ....Death from radiation is almost always excrutiatingly painful and protracted. ...The neutron bomb is specifically designed to kill people by neutron radiation. ....The unique, distinguishing feature which makes nuclear radiation so dangerous is that it causes 'ionisation', or static electricity, among the atoms of any material it passes through. ....In so doing they can greatly damage human tissue. ....

An unborn child in its mother's womb is more susceptible to radiation (underlining added) than adults or even children. ....The foetus is at the most vulnerable between the second and sixth weeks following conception. If the foetus suffers radiation exposure then, ...a wide range of birth effects could result ....right through to severe disturbances of the central nervous system leading to mentally retarded babies..... Gestation dates fetus is most vulnerable to mental retardation - 16th to 20th week. ...

Whenever possible, iodine-131 should not be administered to a pregnant woman. Beginning in the tenth week of gestation a fetus's thyroid gland accumulates iodine, and at a faster rate than the mother's glands."
(Goodwin: pp.40,47,206,208)

"In the human fetus, especially in the first trimester, injuries can be sustained from doses of from 1 to 10 rem (1,000 to 10,000 millirem). ((NB - a small, 1-kt nuclear weapon air-burst explosion has a lethal initial-radiation-dose of 500 rem up to 0.5miles! !)). At later growth stages, the fetus is not as radio-sensitive but is still quite vulnerable.... No matter how small, any dose of radiation involves a risk to human health. The higher doses produce greater risks than the lower doses. ... There is no risk free dose of radiation. No matter how small, any dose carries a small risk of cancer or hereditary defects."(Jacobson/Sakalosky: 1980. pp. 25,29,30).

"An additional array of harmful bodily influences have been either demonstrated, or are suspected to be caused by radiation exposure - including impaired growth and development ... and damage to the central nervous system. ....

A second Hiroshima truth for us is that of the weapon's unending lethal influence. Radiation effects were (and are) such that the experience has had no cut-off point. Survivors have the possibility of experiencing delayed but deadly radiation effects for the rest of their lives.That possibility extends to their children, to their children's children indefinitely

into the future - over how many generations no one knows." (Lifton 1982: pp. 42,45,46)

"In a nuclear war, the process of psychic numbing may well be so extreme as to become irreversible. ...

For those who manage to stay alive, the effects of radiation may interfere with their capacity to reproduce at all or their capacity to give birth to anything other than grossly deformed infants. But few indeed would would have to face that prospect.

The question so often asked, 'would the survivors envy the dead' may turn out to have a simple answer. No, they would be incapable of such feelings. They would not so much envy as, inwardly and outwardly, resemble the dead." (Lifton & Erikson: 1982)

A very recent document written by Dr. Russell A Dusewicz of Research for Better Schools, Inc. Philadelphia, Penna. reports on the Sternglass/ Bell study regarding variations in SAT scores vis-a-vis nuclear testing.

His observations:

"SAT Improvements Tied to End of Nuclear Testing

Researchers who previously linked declines in SAT scores during the 1970s to harmful effects of fallout from atmospheric nuclear tests find greater support for their reserach in the reversal of declining scores 18 years after such tests stopped.

Ernest Sternglass, a professor of radiological physics at the University of Pittsburgh School of Medicine and Steven Bell, associate professor in the Department of Education and Psychology at Berry College, had previously described a correlation between the start of nuclear testing and the first downward trends in SAT scores 18 years later.

These nuclear tests, and the subsequent fallout, introduced radioactive particles into the atmosphere, many of which found their way into the food chain. Among these particles was iodine-131, found in high concentrations in milk following the tests. Studies have shown that abnormally high levels of iodine-131 ingested in milk can result in hypothyroidism and suppressed intellectual development.

States closest to or downwind from atomic testing show the highest correlation between levels of radioactive iodine-131 in milk and SAT score declines 17 or 18 years later. 1975, 18 years after the largest nuclear test in Nevada, showed the sharpest decline in SAT scores, and declines were higher in the Western states. The decline in test scores slowed in 1977 and 1978, 18 years after a temporary moratorium on nuclear testing." (Dusewicz 1983: p.3)

It is an indisputable, frightening fact - nuclear bomb fallout "acts on the thyroid of the developing fetus in the mother's womb and during infancy, when the

thyroid is known to control the development of cognitive functions." (Sternglass & Bell: p.539) The professors continue:

> "The principal evidence linking the decline in SAT scores to nuclear fallout involves the temporal and geographic patterns of the year-by-year changes in the scores." (These patterns closely parallel the series of nuclear tests of bombs conducted 17/18 years earlier when most SAT test-taking students in the seventies were born.) "Extremely large quantities of radioactive iodine were found in commercially available pasteurized milk. This short-lived fission product (with a half-life of eight days) is known to concentrate strongly in the fetal and infant thyroid."(p.539)

Other supporting facts

The Sternglass/Berry study does not stand alone. In addition, in 1965, Sutow and colleagues pointed out that follow-up tests of children who had accidentally been exposed to iodine-131 during early Marshall Island bomb tests in 1954, suffered thyroid damage accompanied by growth retardation. It is unquestionable, hypothyroidism, or the faulty production of the thyroid hormore necessary for normal mental development, is a powerful biological mechanism which can eventuate in damage to human cognition.

Additional facts supporting the Sternglass/Bell hypothesis that nuclear radiation is associated with impaired cognition functions include:

1- The steady decline in SAT scores begins 18 years after 1945, the year in which the first series of atomic bombs were detonated.

2- Beginning with 1977/78, precisely 18 years after the 1959 moratorium which temporarily halted the massive infusion of radioactive materials into the environment, there was a corresponding abrupt slowing in the decline of SAT scores.

3- This striking paralleling of SAT scores and nuclear tests is clearly evident in the following SAT verbal scores averages:

(a) for those born in 1945, (year the first A-bomb detonated), average score 18 years later was approximately 480.

(b) for those born in the 1950s, (the years of the first series of the

Nevada tests), their average scores 18 years later were approximately 460 in the late 1960s and approximately 430 in the early 1970s.

(c) for those born in the early 1960s, (the second Nevada test series years), some 18 years later their verbal score average was 420 in and around 1980 !

(d) Equally significant, this decline pattern was consistently evident in the average Mathematics scores during this period.

4- Even stronger evidence is to be found in the fact that the sharpest decline in SAT scores was documented for youths born in the precise years when the annual kilotons; i.e., thousands of tons of TNT equivalent, detonated in Nevada was the greatest! When the annual decline in SAT scores is plotted against annual weapon kilotons detonated 18 years earlier, the two curves are virtually mirror images.

5- Very clear geographic differences add strong, supportive evidence to the validity of the Sternglass/Bell hypothesis. Consider the following:

(1)- "the greatest decline for the two-year period bracketing the 1957 birth year, (the year in which the greatest amount of fallout from Nevada tests occurred), was ...in the Far West, closest to the Nevada, Pacific, and Siberian test sites.

(2)- "The two year decline in verbal scores was nine points for the Midwest region, where the large metropolitan areas of Detroit, Chicago, and St. Louis are located, but it was 19 points for the western region, which includes Nevada, Utah, and Alaska - where the fresh fallout had been heaviest. (underlining supplied) ....

(3)- "For Utah ....where SAT scores had been among the highest in the U.S., the decline in both Verbal and Math scores was by far the largest. The verbal scores declined by 26 points and the math scores dropped by 15 points in a period of only two years for the birth years 1956-58; a period that corresponded to the years of the heaviest measured fallout in the fifties. Yet, during the same period, for the heavily industrialized state of Ohio - some 2,000 miles to the east of the test site and south of most of the Nevada fallout clouds drifting nor theastward across the U.S. and Canada - the verbal scores declined by only two points, while the math scores actually rose by four points." (Sternglass/Bell: p.541)

6- In summary, the Sternglass/Bell investigation revealed the following significant facts:

(A)- "the strongest correlation between radioactivity in the milk for the years 1961 and 1962 - when atmospheric bomb tests were at their highest level - and the verbal SAT score declines for 1978, some 17 years later; (i.e., scores for individuals who had been one year old or less when the bomb tests took place) ....This is consistent with the hypothesis that the strongest effects of radioactivity are on the developing infant just before birth and for the next one to two years. ....

(B)- "The strongest correlation existed for iodine-131, (among the various fission products in the milk), the fission product which controls the development of the brain; ....a large negative correlation (Pearson r = -0.5502), corresponding to declines in the verbal SAT scores; ....combined with a high (statistical) significance; (p = 0.001) - exists only for iodine-131." (Sternglass/Bell: pp. 542, 543)

With the publication of the 1982 SAT scores, further substantiation became evident, in the words of Sternglass/Bell, in the link between radioactive fallout and SAT score declines. The states of Nevada, Utah, Arizona, California, Idaho, Oklahoma, Washington, and Alaka - <u>all</u> in the West, evidenced both verbal and math score declines between 1981 and 1982. Iodine-131 was recorded for the first atomic test! (U.S.Dep't of HEW: 1965)

Additionally, Nevada and Utah <u>again</u> evidenced maximum declines; (Utah dropped -17 in verbal and -20 in math: Nevada -9 verbal and -6 math). The Utah declines were the <u>greatest declines</u> ever reported for any state in the U.S. It is once again noted that the Utah decline appears entirely consistent with the close, downwind, contiguous location in relation to the test site area in Nevada.

These then are the salient facts which strongly support "the conclusion that fallout from nuclear weapons was a significant and previously neglected facor in the recent decline of cognitive ability among young Americans." (Sternglass/Bell: p.544) :

1- The very dramatic drop, both in SAT verbal and math scores during the 1970s, correlate substantially with radioactive iodine-131 release

into the environment.

2- this correlation was found to be strongest for infants.

3- these damagaing effects were most evident in the states in close proximity to the test site.

4- these results, clearly evidencing highly localized SAT scores variations, were strongest in Utah, "known for a high level of scholastic achievement among its predominently Mormon population." (Sternglass/Bell: p.544)

5- This 'deadly' comparison:

> ".... evidence for fallout as an important factor in score declines, becomes even stronger when taken together with the evidence that fetal deaths, infant mortality, low birth weight, and congenital defects show the same pattern of high correlation with fallout on a state-by-state basis during the period of nuclear tests." (Sternglass/Bell: p.544)

6- Recent increases in leukemia among Utah-born children following the beginning of the Nevada testing, as well as world-wide increases in infant mortality, leukemia and cancer correlating with nuclear fallout, are described, in chilling detail, in Lyon et all (1979); Sternglass (1965 & 1981); U.S. Monthly Statistics (1979)

7- And finally - Rinland & Larson, in 1981, noted that this counter-productive impact of radioactive fallout has not been limited to falling SAT scores. It is also evident in: (1) falling IQ scores; (2) sharply rising rates in:

vandalism	learning problems
juvenile delinquency	violence against teachers in school
truancy	

In my view, the above are very grave, very sobering, grim facts. They have serious implications for the future of mankind; society; civilization! As Sternglass/Bell conclude:

> "If only a handfull of small 'tactical' weapons totaling less than 1,000 kilotons, (or a single magaton of TNT-equivalent explosive power),

detonated in Nevada, far from our most heavily populated centers - could produce major effects on the cognitive abilities of a generation of children who were exposed to the distant fallout, then these results indicate that the intellectual abilities so essential to any modern society would be seriously impaired even in a limited nuclear war." (p.545)

EPILOGUE

Our species, characterized principally by the abilities to reason; imagine; use abstract symbols to organize and transmit knowledge to future generations; is faced with a potential threat of extinction. Place the man-created tragedy of mental-defectiveness-through-nuclear-explosion-radiation-fallout into the even greater species-threat of destruction/extinction through nuclear slaughter.

Consider soberly - with grave understanding - that the 6 August 1945 Hiroshima fission bomb explosion, among its other horrors, left a monstrous legacy for all of humanity. Schell (1982) describes it as follows:

"By present-day standards, the bomb was a small one. (Please visualize the enormity of this explosion. It would have required 12,500 Tons of TNT to release the same amount of energy!), and in today's arsenals it would be classed among the merely tactical weapons. Nevertheless, it was large enough to transform a city of some three hundred and forty thousand people into hell, in the space of a few seconds. ...In that instant, tens of thousands of people were burned, blasted, and crushed to death. Other tens of thousands suffered injuries of every description or were doomed to die of radiation sickness.....

"In the months and years following the bombing of Hiroshima, after radiation sickness had run its course and most of the injured had either died of their wounds or recovered from them, the inhabitants of the city began to learn that the exposure to the radiation they had excerienced would bring about a wide variety of illness, many of them lethal, throughout the lifetime of those who had been exposed..... Also, fetuses exposed to the bomb's radiation in utero exhibited abnormalities and developmental retardation.....

"Surviving children who were exposed in utero ...were more often mentally retarded. One of the most serious abnormalities caused by the exposure to the bomb's radiation was microcephaly - abnormal smallness of the head, which is often accompanied by mental retardation. In one study, thirty-three cases of microcephaly were found among a hundred and sixty-nine children exposed in utero.....

"The number of people who were killed outright or who died of their injuries over the next three months is estimated to be a hundred and thirty thousand." (pp: 36,37,45)

130,000 human beings killed; just how large is that number. To get some idea of its enormous size; were you to begin counting, right now, uninterrupted, at the rate of 1 person killed EACH DAY, you would still be counting after 356 years !!

For me, that it a positively obscene number of people annihilated; their lives snuffed out in an instantaneous calamity - manmade !! I submit that any species capable of perpetuating such unspeakable horrors on other members of its own species is indeed sick - dangerously sick.

As the authors of "Hiroshima and Nagasaki, "a comprehensive study carried out by a group of distinguished Japanese scientists and published here in 1981" concludes; 'an atomic bomb's massive destruction and indiscriminate slaughter involves the sweeping breakdown of all order and existence - in a word, the collapse of society itself, and that therefore the essence of atomic destruction lies in the totality of its ipact on man and society.' ....

> "The Hiroshima people's experience, accordingly, is of much more than historical interest. It is a picture of what our whole world is always poised to become - a backdrop of scarcely imaginable horror lying just beyond the surface of our normal life at any second. Whether we choose to talk about it or not, it is an omnipresent, inescapable truth about our lives today that at every single moment each of us may suddenly become.... one of the millions of corpses. For whatever our 'modest hopes' as human beings may be, every one of them can be nullified by a nuclear holocaust. ....
>
> "The earth is the largest of the support systems for life, and the impairment of the earth is the largest of the perils posed by nuclear weapons." (Schell; pp: 5,45,46,47)

And finally - professors Sternglass and Bell chillingly conclude:

> "The fission products produced by nuclear bombs are among the most powerful biological agents ever developed.... their most devastating action is on the hormonal system controlling the mental development of the newborn." (p.545)

Homo sapiens, 'thinking man', had best dwell critically on all of these awesome facts. For it does not require genius-level intelligence to recognize

that now mankind is literally capable of permanently depressing the mental development of his own species!

What then is the fate of the Earth to be? We unleashed this ghastly horror of atomic weaponry. We must stifle it; we must control it; we must master it before we are destroyed by it!

* * * * * * * * * * * *

1983

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